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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 4, 1943

DETROIT



Women at War

See Page 152

A SCIENCE SERVICE PUBLICATION

Do You Know?

Small workshops in England produce about 40% of her total war production.

Salt from seawater will soon be produced commercially in New Zealand by solar evaporation.

Cuban and Puerto Rican molasses may soon reach American ports dehydrated and packaged in paper bags.

A plant to make battery carbon for dry cells, capacity a million pounds a year, has just been completed at Pampa, Texas, near the Panhandle petroleum fields.

Over 8,500,000 hunting licenses were purchased by American sportsmen in the 1941-42 season at a cost of nearly \$14,000,000; they paid an additional \$1,500,000 for federal duck stamps.

Two 20,000 horsepower electric motors will be used in the Army's new stratosphere wind tunnel at Wright Field to create a 600-mile-an-hour gale to test aircraft in a temperature about 60 degrees below zero Fahrenheit.

Naval vessels use steam turbines connected through reduction gearing to propeller shafts; with propeller improvements, and higher steam pressure and temperature, efficiency has been increased over 25% since World War I.

Magnesium will compete strongly with aluminum in lightweight construction after the war as raw materials are plentiful; 15 plants are producing large amounts now for war uses both from common minerals and from seawater.

SCIENCE NEWS LETTER

Vol. 44 SEPTEMBER 4, 1943 No. 10

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Question Box

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AGRICULTURE

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ENGINEERING

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ENTOMOLOGY

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GENERAL SCIENCE

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Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

Cotton camouflage nets treated with a new chemical finish are fire, water and weather resistant in all climates.

Chromated zinc chloride forced into lumber in pressure chambers increases the length of life of the lumber from three to ten fold.

form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The Science Observer, established by the American Institute of the City of New York, is now included in the SCIENCE NEWS LETTER.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

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HORTICULTURE

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MEDICINE

The infected area for what disease crosses the Pan-American highway? p. 156.

What experiments have been conducted with penicillin outside the armed forces? p. 148.

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NUTRITION

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VOLCANOLOGY

By gaining the Eolian islands, what volcanoes did the Allies acquire? p. 158.

War production is using over 40% of the power produced by the Tennessee Valley Authority.

Approximately 4,000,000 barrels of oil had to be pumped into the Texas end of the new "Big Inch" pipe line before any reached the Eastern seaboard.

Lewis, Wistar Institute. Nominated by the National Research Council: Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Hugh S. Taylor, Princeton University. Nominated by the Journalistic Profession: O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchofer, Buffalo Evening News; Neil H. Swanson, Executive Editor, Sun Papers. Nominated by the E. W. Scripps Estate: Frank R. Ford, Evansville Press; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithton, Cincinnati, Ohio.

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PHYSICS

New X-Ray Use Forecast

Production for the first time of 100,000,000-volt X-rays makes available a new sort of ray with extraordinary penetration. What they can do is not known.

► THE PRODUCTION for the first time of 100,000,000 volt X-rays through use of the new giant induction accelerator of the General Electric Company promises to usher in a new era of X-ray utilization.

In one stupendous step from about 2,000,000 volts to fifty times that potential, X-rays of a new sort with extraordinary penetration will now be available, first for experimental work and then for industrial and possibly medical use.

The scientists operating the new machine have noted that it may be easier to protect people against the hundred million volt X-rays. This is possible because whereas the lower voltage X-rays are spread out fan-like, the super X-rays are produced in very narrow beams. No one yet knows just what the world's most powerful X-rays can do.

The induction accelerator, or betatron, as it is also called, operates on a principle different from the customary X-ray tube now in wide industrial and medical use. Developed by Dr. D. W. Kerst of the University of Illinois, the induction accelerator was first built in a 2,300,000 volt version and then as a 20,000,000 volt machine which was turned over to Dr. Kerst and the University of Illinois for research use. Meanwhile construction of the 100,000,000 volt machine was hurried along as fast as more urgent war work would allow because of the expectation that the X-rays it makes possible might prove practically useful in inspection of large metal castings.

In principle the new X-ray machine gives electrons, particles of electricity, a continuous push so that a potential of a few thousand volts is built up to one hundred million volt energy, which is allowed to smash into a target to produce the super-powerful X-rays. In the conventional X-ray tube based on the pioneer work of Dr. W. D. Coolidge, G.E. research director, under whose direction the new machine was also built, the electrons from a hot filament are given the impulse of a high voltage current separately generated.

About 50 conventional X-ray tubes of

a million volt energy are in industrial use today. The only other device creating such energies in particles is the cyclotron which has been placed under construction at Berkeley, Calif. This machine uses a different principle and instead of accelerating electrons to give X-rays applies high speeds to the hearts of atoms, such as the protons of hydrogen and the deuterons of heavy hydrogen or deuterium.

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GENERAL SCIENCE

American Science Teaching Facing Crisis in Schools

► SCIENCE TEACHING in American public and private high schools is facing a crisis because of a lack of properly qualified teachers. Many former instructors are now in the Army. Large numbers of teachers, both men and women, particularly in physics and chemistry, are employed in war industries where salaries far above school levels are obtainable.

The so-called defense training classes,

operating on an around-the-clock basis in many high schools, are using in many cases part of the time of regular high school science instructors, leaving less time available for their regular classes for high school boys and girls. The same is true for instructors in shop, drafting, and stenography and typing.

In fact, all schools are suffering from a shortage of qualified teachers in all subjects and in all grades. Low salaries are partly responsible.

Special study has been given to what he calls the deterioration of the American public schools by Prof. Willard Waller of Columbia University. He feels that the loss of the younger and better qualified teachers will result in a generation of poor education ahead. He recalls conditions during and following World War I. Juvenile delinquency and increased immorality resulted then and may be expected now, he claims.

Prof. Waller suggests that to cut down youth problems and mass hysteria every effort be made to defer younger man teachers from draft, and to raise salaries to keep the more competent teachers, both male and female, in the school.

"Any man who can keep boys from committing crimes and off the streets is in essential work," he declares. "A whole generation of boys and girls, otherwise, will grow up with sub-standard education which will have permanent and far-reaching effects when they enter the adult world."

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LIGHTNING STRIKES—A hole seven inches deep and this interesting pattern of burned grass were made by lightning striking the golf course green of a Pittsburgh country club. The photograph was made by Dr. J. M. Conway, physician of Pittsburgh.

MEDICINE

Penicillin Is Potent

Studies confined to diseases likely to hit armed forces and to those resistant to sulfa drugs find the mold-drug a remarkable germ fighter.

► A "REMARKABLY POTENT" germ fighter is the verdict on penicillin reported by the National Research Council's Committee on Chemotherapeutic and Other Agents after a study of 500 cases treated with the new chemical from mold (*Journal, American Medical Association*, Aug. 28).

Since only small amounts of penicillin were available for the clinical tests, it was necessary to limit both the number of patients treated and the types of infection studied. The 22 groups of investigators accredited by the National Research Council Committee were directed to study those infections that are most likely to occur in the armed forces and to those that are resistant to the sulfa drugs.

Particularly striking were the results of treatment on gonorrheal infections that sulfa drugs had been unable to put to rout.

"Here, then," the report states, "is a most potent weapon in the treatment of sulfonamide-resistant gonorrhea, and it is not too much to predict that penicillin will prove to be one of the most effective agents in the treatment of a disease that causes great ineffectiveness in the armed forces and in the civilian population."

Patients with pneumococic pneumonia frequently recovered following a three-day course of treatment, an especially important achievement where the infection has resisted the sulfa drugs.

In treating 55 patients with osteomyelitis, a disabling inflammation of the bone and marrow, 48 recovered or improved and 7 showed no effect. Lesions that had been present for months or years healed completely in two to three weeks. But in some cases the lesions recurred after a time and the scientists warn that it is too early to judge the final outcome of the cases treated.

Summarizing the results of the study, the committee reports penicillin to be most effective in fighting staphylococcal, gonococcal, pneumococcal and hemolytic streptococcus infections.

It has failed disappointingly in treating bacterial endocarditis, an inflamma-

tory infection of a membrane lining the heart.

Dosage of the new drug varied tremendously from case to case due to the limited supply of the drug and because little is known about the best dosage for some conditions.

The drug can be administered by injection into the veins, muscles or applied locally to a particular spot. It has proved ineffective when given by mouth. Since the drug is excreted so rapidly, injections must be continuous or at intervals of a few hours to obtain an adequate amount of potent material in the blood and tissues.

Toxic or poisonous effects, which sometimes occur in treatments with many drugs, were rare. Itching skin eruptions, called urticaria, occurred in 14 cases treated; their cause remains obscure. Fleeting attacks of headache, flushing of the face, muscle pains and other effects observed in some cases were evidently due to toxic substances in the drug carried over from a purifying process. These were removed by filtering and recent lots of penicillin have not caused these reactions.

Clinical results were collected and summarized for the medical profession by Dr. Chester S. Keefer of Boston, on behalf of the National Research Council's Committee on Medical Research, and the Committee on Chemotherapeutic and Other Agents which also includes Dr. Francis G. Blake of New Haven, Conn.; Dr. E. Kennerly Marshall, Jr., of Baltimore; Dr. John S. Lockwood of Philadelphia and Dr. W. Barry Wood, Jr., of Baltimore.

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GENERAL SCIENCE

Cabbage Odor to Warn Mine Workers of Danger

► SMELL rotten cabbage? It may be an emergency if you are down in a metal mine. In a report to mine owners, the U. S. Bureau of Mines recommends use of the chemical ethyl mercaptan, which has such a stench, as the most effective method of warning mine workers to return to the surface.

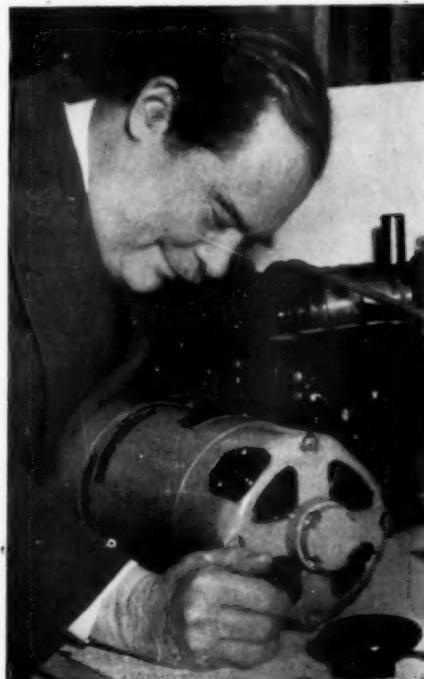
The foul-smelling chemical is easily obtainable, relatively cheap and non-poisonous even in heavy concentrations. Other odorous chemicals also may be used for this purpose.

Warning odors transmitted by compressed-air lines have been used by some mines for years as danger signals and have proved effective in disasters, particularly mine fires.

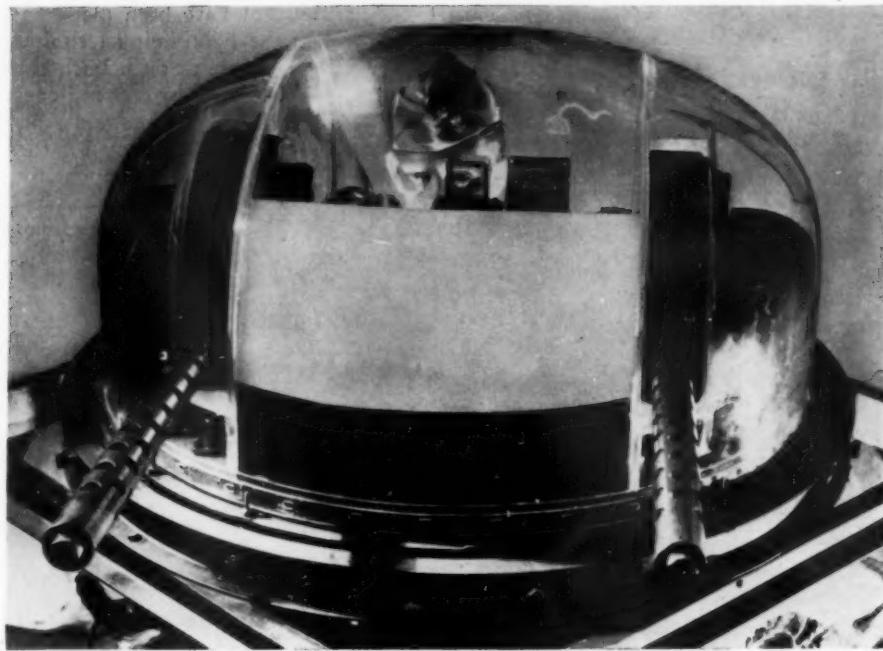
"Every mine using compressed air underground should install such a device and keep it ready for prompt operation," the report states. "It is cheap insurance and a real safety measure that may save many lives."

"Metal mines often are very deep, and the men must work on numerous levels out of direct communication with the surface. In many instances they cannot be warned quickly of an emergency or mine fire by telephone or other usual methods of communication."

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INVENTION — Ordinarily an unfortunate accident, the short circuit has been put to work through the ingenuity of Dr. E. F. W. Alexander and other General Electric engineers. The amplidyne which he is holding consists of a short circuit with a coil arrangement known as a compensating field winding. It makes possible delicate control of powerful electric machinery in war plants and on battle fronts.



AIDED BY SHORT CIRCUIT—The guns in this aircraft turret can be maneuvered more easily with a new device called the amplidyne. The whitened out area is not the amplidyne; it hides the turret mechanism which must remain a military secret.

NUTRITION

Protein from Corn Germ

A new process makes this important part of corn, now fed only to livestock, good for human food which may help ease the meat shortage.

► WITH MEAT shortages making everyone increasingly protein-conscious, news that a half-billion pounds of good protein a year may be made available for human consumption comes from the chemical laboratories of the University of Illinois. It is corn protein, in the germ or unsprouted plant tucked in the corn grain, which is at present used principally as animal feed because of the tendency of corn germ to turn rancid quickly.

A new kind of "de-fatted" corn germ, with this oil extracted and saved, has been put through a series of tests on laboratory animals by Dr. H. H. Mitchell at the University, who has now made a preliminary report to the National Research Council in Washington, D. C. In it he states that "except for the cashew nut, defatted corn germ is the only plant food we have studied, the protein of which possesses as high a biological value as lean meat."

To solve the problem of corn germ spoilage, a commercial firm in Monticello, Ill., the VioBin Corporation, has devised a method of extracting the oil at "pre-cooking" temperatures. The fat content is reduced to 2%, moisture to 8%, so that the keeping qualities of the defatted germ have been greatly improved. When the corn germ was found to be palatable to human beings, the University of Illinois began checking the nutritional values of this new food, hopeful of increasing the value of the corn crop.

Dr. Mitchell's feeding experiments showed that de-fatted corn germ contains 21% protein, which is 85% as digestible as beef protein and with a biological value quite as high. It is also rich in several vitamins and has a high mineral content. Its iron content assays at the exceptional figure of 300 parts per million.

Even before full publication of Dr.

Mitchell's findings, plans are being made to step up commercial production of corn germ, to help meet the shortage of protein foods. The first large-scale production, two million pounds a year, may be required mainly for export, perhaps as an ingredient in dried soups. This pre-cooked food may be used also as a filler and protein supplement for meat products, and as an ingredient in various cereal products.

Increased production depends upon priorities for processing machinery, which is neither complex nor expensive. There is plenty of the raw material—germ from dry degenerated corn, since about 10% of the average corn is germ, of which about one-half can readily be saved.

Huge amounts of corn germ, discarded in making breakfast cereals, hominy and corn meal, can be defatted; it can also be had from plants making alcohol from corn, for the germ is a handicap in alcohol production.

According to present estimates, perhaps 750 million pounds of corn germ per year are potentially available for use. This would produce about 500 million pounds of defatted corn germ, in addition to 200 million pounds of corn oil, which would double the American output of this oil.

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ENGINEERING

High Frequency Current Used to Explode Rivets

► QUICKER and at the same time more secure riveting in airplane construction is achieved by making the rivets explode themselves, in a method patented by L. A. Burrows and M. A. Cork of Woodbury, N. J., and R. M. Girdler of Sewell, N. J. The now familiar explosive rivets carry a small charge of explosive in their hollow ends, which is set off by touching an electrically heated iron to their heads. This, however, causes some expansion in their heads and shanks, interfering to that extent with an exact fit. The three inventors obviate this by utilizing a high frequency current to produce induction heating, and by loading the rivets with an explosive having a lower ignition point.

Rights in their patent, No. 2,327,763, are assigned to E. I. du Pont de Nemours and Company.

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NUTRITION

New Ration for Cows

Is bulkier because of wartime scarcity in concentrated dairy feeds, but new diet for Bossie contains all essential food elements and is balanced.

► RATIONING for Old Bossie makes her let out her belt rather than take it in, because wartime scarcity of standard concentrated commercial dairy feeds has made it necessary to substitute feed-stuffs grown at home on the farm, and while these carry the same essential food elements into the cow's stomach they require more bulk to do it. Working out a balanced home-grown ration that will keep cows healthy and producing a full supply of milk is one of the tasks that has occupied dairy scientists at the New Jersey Agricultural Experiment Station.

Hardest part of the job has been to keep up the protein level; it was largely for proteins that farmers used to buy the now almost unobtainable concentrates like cottonseed meal. For proteins they also included grain in the dairy ration. Legume crops, especially alfalfa and soybeans, have provided the solution to the problem. They are fed partly as silage, partly as hay, supplemented of course with a few ounces of mineral salts. The typical ration as worked out contains two-thirds roughage and one-third corn whereas the ratio in pre-war times was half roughage, half grain. An experimental ration now being worked on looks toward the possibility of eliminating the corn entirely and

putting the cow on an all-alfalfa diet.

Another problem which the dairy farmer has had to face has been the lack of molasses. This imported product is normally used in wetting down the grass crops as they are packed into the silo; its fermentation produces the acid condition that prevents the silage from spoiling. Since the war has made molasses extremely scarce, it has been found practicable to use sorghum for the same purpose. Sorghum and soybeans are grown together and cut together for silage. The sugary sap of the sorghum pinch-hits for the lost molasses, and the soybean plants boost the protein percentage.

Of less immediate utility but great potential importance to the milk-producing business are experiments being conducted on the possible usefulness of sex hormones, or gland extracts, in inducing lactation in heifers that have never had a calf and are apparently incapable of having one. One such heifer, treated with the sex hormone known as estrogen twice weekly for 14 weeks, has been yielding 16 quarts of milk a day for several months. Another animal, a cow that had reached the "worn-out" age, has responded to a ten-week estrogen treatment by coming back to a daily yield of 10 quarts.

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new varieties that have been made possible through the hybridizing technique will never grow true to seed. Each seed generation is produced by crossing anew two utterly unlike parent strains, and if you plant seed from your own garden you will only get a most disappointing assortment of runts and freaks, with only an occasional good stalk among them, the results of what plant breeders call "hybrid segregation."

Easiest of all seeds to save are those of some of the large-fruited crops, like tomatoes, peppers and melons. All you need to do is split open the thoroughly ripened fruit, spread out the wet pulp containing the seed and let it dry. Then rub the seed out of the pulp and separate it. Peppers have virtually no wet pulp and are easiest to handle; tomatoes and cantaloupes vie for the messy distinction of being the pulpiest.

An even easier method for getting tomato seed, used for years at the New Jersey Experiment Station, is to dump the pulp into a jar with a little water and let it ferment until the pulp completely disintegrates. Contrary to expectations, this does no harm to the seed. They eventually settle to the bottom, leaving the frothy fermented pulp floating at the top. This is poured off, and the now well-cleaned seed are spread on sheets of paper or cheesecloth to dry.

Most experienced gardeners do not regard the saving of small seeds, like those of radish, lettuce and carrots, as worth while. These require combinations of soil, climate and growers' skill that are found in only a few limited areas in the country, where seed production is a speciality. Commercial production promises to be adequate for all anticipated needs.

Saved seed must be kept dry, and preferably cool. Insect pests must be excluded. The best containers are cans or jars with good tops, the latter perforated with tiny holes that will permit ventilation but not admit the ubiquitous hungry insects.

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HORTICULTURE

Preserve Garden Seeds

Hints on which seeds to save from this year's crop will help give you a good start on the 1944 Victory Garden. Not all seeds are worth keeping.

► VICTORY GARDENERS, most of their harvest laid by, can now busy themselves with plans and preparations for the 1944 season. One such activity that will certainly pay for itself is the saving of some kinds of seed for the Victory Garden of 1944. The U. S. Department of Agriculture and various state experiment stations are offering good suggestions along this line.

In general, the biggest seeds are

easiest to save and most worth saving. Hand-shucked bean seeds from your own garden are likely to be better than the commercially prepared kind, because the latter are put through a mechanical thresher which may injure some of them. This is especially likely to be the case with lima beans.

Among the larger seeds, however, is one kind that definitely should not be saved—hybrid sweet corn. The splendid

● RADIO

Saturday, Sept. 11, 1:30 p.m., EWT

"Adventures in Science" with Watson Davis, Director of Science Service, over Columbia Broadcasting System.

Dr. Ruth F. Benedict, Lecturer in Anthropology at Columbia University, will tell how the knowledge of anthropologists concerning the populations of other countries is being used to make the war effort more effective.

MEDICINE

Help for Diabetics

An improved insulin treatment which combines two previous treatments simplifies the use of insulin and gives better control of blood sugar.

► A MIXTURE of two forms of insulin which simplifies treatment of diabetics and gives better control of blood sugar is announced in the *Journal, American Medical Association* (Aug. 28).

Slow-acting protamine zinc insulin, already in use for several years, is mixed with the original type of rapid-acting insulin to make a single daily injection having many of the advantages of both types.

Protamine zinc insulin has been used to reduce the number of injections necessary for most diabetics compared to the use of ordinary insulin. But since the insulin is slowly released from the protamine zinc compound at a steady rate throughout the day and night, moderate and severe cases of diabetes have not always received adequate control of the blood sugar level after meals when the need for insulin is greatest.

To combat this condition, physicians have been prescribing an additional second injection of regular insulin along with the protamine zinc form usually to be taken just before breakfast. Thus the prolonged action of protamine zinc insulin protects against too much blood sugar at night, while the regular insulin tends to control the rise of blood sugar after meals.

Objections to this solution of the problem are that it is a compromise method requiring two injections a day, thereby partly nullifying one of the chief advantages of protamine zinc insulin, and it requires the patient to use two different forms of insulin with two different doses, thus increasing the possibility of error.

Following the lead of earlier workers, two groups of physicians report successful clinical trials using a mixture of the two insulins in a single injection.

Drs. Cyril M. MacBryde and Harold K. Roberts of St. Louis conducted a comparative clinical study on 62 patients using a mixture of three parts of fast-acting insulin to one part with slow effect.

It was discovered, however, that acidity or alkalinity affected the amounts of the two kinds of insulin found in the

final mixture. To avoid this uncertainty, the insulins were mixed and adjusted to a slight alkalinity about the same as that found in body tissues, which produced a final product of the proper composition.

Use of the new insulin mixture on severe diabetes not only controlled blood sugar as well as when both insulins were given separately, the physicians report, but gave better regulation in most cases. Less expected were results on mild cases which showed that the 3.1 insulin gave better effects than the usual treatment of these cases in which protamine zinc insulin alone is administered.

Another study, using a different mixture of the insulins containing two parts of regular and one part of protamine zinc, is reported by Drs. Arthur R. Colwell and Joseph L. Izzo of Evanston, Ill. Their studies on 60 patients reveal that a single injection of this mixture also gives better control than that obtained with standard insulins injected more often.

The insulin is released at a rate which causes moderate increases in intensity when needed after meals, the physicians explain, and allows decreases when desirable during sleep. Dosage is about 10% less than with ordinary methods because of improved efficiency.

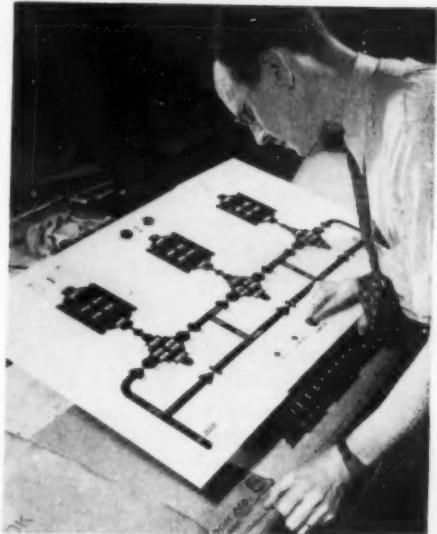
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ENGINEERING

Electrical Nurses Rushed For 20-Inch Fuel Pipeline

► "ELECTRICAL NURSES" are being rushed to completion as part of the \$860,000 worth of equipment being built by the Westinghouse Electric & Manufacturing Company in Pittsburgh for the 20-inch pipeline scheduled for operation between Texas and the East Coast by year's end.

An "electrical nurse" will be located at each of 29 pumping stations to take the temperature of motors, pumps and bearings, to feel the pressure "pulse" in the pipe, and to show the station operator through what steel arteries fuel



PIPELINE NURSE — A few push-buttons will control the flow of millions of gallons of vital oil products through the 20-inch pipeline now being built between Houston, Texas, and the Eastern Seaboard. For each of the line's 29 pumping stations Westinghouse Electric & Manufacturing Co. is building an electrical "nurse" consisting of a control desk with a diagram of which this is a model.

is flowing. The device designed by Westinghouse engineers is a waist-high control desk about eight feet long with a plastic top on which is imprinted a diagram of the station, showing each motor, pump, valve and pipe.

Beneath the diagram 60 tiny electric lamps report operating conditions.

"If one of the three pumps in the station develops an abnormal temperature or pressure," explained M. A. Hyde, petroleum industry engineer, "a tiny red lamp flashes on to show the trouble spot on the diagram. But the operator doesn't have to move a finger to shut the unit down—the same thermostat or pressure relay that flicked on the tell-tale lamp sends into action protective devices which automatically stop the electric motor and close the valves leading into the pump, causing other valves to open, re-routing the fuel around the idle unit."

Oil will be pumped through the pipeline by 88 electric motors with a total of more than 100,000 horsepower—a force equivalent to 18 mountain freight locomotives pulling at full throttle. These motors will deliver 235,000 barrels of gasoline daily.

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PUBLIC HEALTH

Illinois, Texas, California Hard Hit by Polio Epidemic

► INFANTILE paralysis is still on the increase in many areas of the nation, with Illinois joining Texas and California during the past week as an epidemic center, U. S. Public Health Service reports show.

With three states, including hard-hit Texas, still not reported, the nation totalled 678 new cases for the week ending Aug. 21, already an increase of nearly a fourth over the previous week's total of 546 for all states.

New cases in Illinois shot up to 117, as against 70 for the previous week, with Chicago and nearby Cook County showing a heavy incidence.

California reached a new high of 163 cases after a downward trend that had raised hopes that the epidemic was slackening. Two Midwestern states that had so far remained in the background of the polio picture attracted the attention of health officials: Ohio jumped from one to 14 cases and Kentucky from three to 22.

Danger point on the eastern seaboard seems to be Connecticut with 47 new cases for the week ending Aug. 21, as against only 27 reported the previous week. Many of the cases were around New Haven, where Navy and Marine Corps trainees were reported to have had their liberty restricted because of the outbreak.

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AGRICULTURE

Chocolate from Ecuador To Help Feed United States

► COCOA, chocolate and other cacao products for the United States may soon be obtainable in increasing quantities from Ecuador in equatorial South America. Other tropical and semi-tropical products which in pre-war days came from the Far East, may in post-war days come more largely from the Western Hemisphere, from its tropical regions on the Pacific coast. A "good neighbor" rehabilitation project in El Oro Province, Ecuador, has this vision as its great objective.

This project is being carried out under the leadership of the Office of the Coordinator of Inter-American Affairs in cooperation with the government of Ecuador. The area concerned, the province of El Oro on the south coast of Ecuador, was laid waste in 1941 in the

century-old boundary dispute between Peru and that country. The actual rehabilitation work in the field started a year ago.

At the end of a year, El Oro now has a good cacao crop for export, as well as some tobacco and coffee, and a record-breaking crop of rice for feeding its own people. It is harvesting rubber from native trees, and gathering native fibers and making bags for packaging its export materials. Poultry and cattle are assisting in its home economies. America's investment in capital, technical assistance, and in good-will may be amply repaid.

El Oro province is about half the size of Connecticut. Its population is around 77,000. It has tropical lowlands near the coast and a high, cool mountainous area inland. It is capable of producing all of its own needs in food and much for export. By way of the Panama Canal, it is about 3,000 miles from New York.

Science News Letter, September 4, 1943

PUBLIC HEALTH

Dengue Fever Outbreak Reported in Honolulu

► DENGUE FEVER has broken out in Honolulu. Reports just received by the U. S. Public Health Service indicate that 76 civilians were stricken up to Aug. 20, the number of cases nearly doubling in about 10 days. Airmen returning from the southwest Pacific are believed to be the source of the infectious disease.

Mosquito eradication measures are being pushed, as the tropical disease is spread by the same mosquito species that carries yellow fever.

Dengue, also known as breakbone fever or dandy fever, is believed caused by a virus which mosquitoes pick up by biting a patient who has it in his blood.

Symptoms come on suddenly after an incubation period of three to six days. Fever goes up rapidly and may reach 105 degrees. Severe pains are felt in the joints, muscles, head and eyes, often accompanied by sore throat and catarrhal symptoms.

After three or four days the temperature drops to normal and the patient feels better. But there is usually a relapse after a day or two and a rash like measles appears.

Dengue occurs mainly in Persia, Egypt, India and the West Indies, where there are sporadic epidemics.

Science News Letter, September 4, 1943

PUBLIC HEALTH

Women Analyze Dust Found in War Industries**See Front Cover**

► ANALYSIS of dust in war industries is important if the danger of harmful exposure is to be kept at a minimum.

Women at the National Institute of Health in Bethesda, Maryland, are shown on the cover of this week's SCIENCE NEWS LETTER performing this important task under the supervision of Dr. W. W. Smith.

This picture is in response to a request from the War Manpower Commission that the various tasks which women can do, sometimes not directly connected with defense jobs, be given greater publicity. The man-power problem today is in a great part a woman-power problem as men inducted into the military services must be replaced by women and older men. By the end of 1943 it is estimated that 17,400,000 women must be working, not necessarily in the factory, but in stores, schools, and offices. A scientific job, these days, is practically certain to be a war job.

Science News Letter, September 4, 1943

AERONAUTICS

Future Planes to Have Better Spacing of Windows

► POST-WAR stratosphere planes can have their windows spaced the way passengers like them best, through the application of a panel construction method on which patent 2,327,636 was granted to John Gerber of Burbank, Calif., assignor to the Lockheed Aircraft Corporation.

In monocoque fuselage construction, in which the shell of the craft supplies most of its own mechanical stiffening and support, locations of particularly stressed areas sometimes conflict with the convenient spacing of windows, and this in turn may necessitate entire redesign of passenger accommodation. Mr. Gerber's method permits the inserting of a whole long panel down each side of the fuselage, carrying window openings at the right intervals for most convenient seating.

Science News Letter, September 4, 1943



ICE FIELDS

NUTRITION

Soybeans Found to Contain More Vitamins Than Wheat

► SOYBEANS, which are being boosted as a supplement to our rationed wartime meat supply, have been found to be good sources of a number of vitamins, in analyses made by Prof. Paul R. Burkholder of the Osborn Botanical Laboratory at Yale University (*Science*, Aug. 27).

Prof. Burkholder determined the percentages of seven vitamins in six of the soybean varieties commonly cultivated for human food. He found no great differences among the varieties, but he did discover that most of the vitamins tested change in concentration as the beans ripen. Thus, thiamin, often called the morale vitamin, is more abundant in ripe beans than in green ones; whereas riboflavin has higher concentration in the green beans. This may eventually be a matter of dietetic importance, since the beans can be eaten either way.

Prof. Burkholder also compared the vitamin concentrations in soybeans, lean beef, lean pork and whole wheat. In all but one (niacin), the beans had a decided advantage over the wheat, and as sources for most of the vitamins they were able to compete on at least even terms with the two kinds of meat.

Science News Letter, September 4, 1943

ENGINEERING

Engineering Society Urges Post-War Construction Plan

► PLAN after-war constructions, both private and public now, so that work may begin immediately at the end of the war without an intervening unemployment period.

Every community should plan so that work will be available to homecomers from the armed services and war industries in their own neighborhoods.

This immediate program is urged by the Board of Directors of the American Society of Civil Engineers. This society, the oldest national engineering society in the United States, states that it is a "conservative" organization, but its officers feel that no time should be lost in preparing for post-war work so that

ill-advised and unnecessary engineering projects will not be undertaken in a mad scramble to "make-work."

Federal money may be necessary for public works, but in practically all cases, the report urges, preference should be given to self-liquidating projects, or "pay-as-used" projects, such as water supplies, bridges, public markets, hospitals, motor tunnels, drainage and irrigation projects. From such undertakings the Federal government may expect reimbursement.

Many local communities will be able to finance their own undertakings through local taxation, the civil engineers state. These include new school buildings, street-repairs, sewage disposal, park improvement, library construction, municipal buildings and public health provisions. States also will be able to finance state-wide projects. The A.S.C.E. recommendations hold that Federal financial aid "should be available only upon the requirement that any and all such financial assistance shall be returned to the government when the financial provisions for the construction of the project have been completed."

Science News Letter, September 4, 1943

ENGINEERING

Coffee Can-Making Method Applied to Fuse Containers

► METHODS used in manufacturing coffee cans, applied to the making of fuse containers in at least one Naval magazine, have speeded up production by five-fold and decreased cost to from one-third to one-ninth of the cost under pre-war methods, saving over \$3,000,000.

Before the new technique was adopted by the Navy, fuse containers were made by hand by sheet metal workers and tinsmiths. After fuses were packed at loading plants, the containers were sealed in these plants by hand-soldering.

Machine methods have now been substituted, the same methods used successfully for years in producing hundreds of millions of cans annually. Machine-sealing is used at the loading plants.

In actual tests the new machine-made, machine-sealed containers are shown to be superior to the old hand-made ones. They keep the fuses in better condition so that they are more reliable in use. They will withstand 15 times the pressure without leakage. No duds result from their use. They have the same reliability as metal containers for perishable foods.

Science News Letter, September 4, 1943

MEDICINE

New Device Would Make Loading Ambulances Easier

► THE PROFIT MOTIVE, supposed to be the dominant drive in all matters relating to patents, steps aside for a combination of humanitarian and patriotic impulses in the case of U. S. patent 2,327,680, which has just been issued to Joseph G. Tavaris of Sutter Creek, Calif.

Mr. Tavaris' invention is an inclined loading track to be used at the loading end of an ambulance, with the double objective of making the loading process less painful and risky to the patient and less laborious to the ambulance attendants. In present practice, the gurney or wheeled stretcher-like carriage on which the patient rests is lifted bodily by two or more men and slid into the ambulance. Mr. Tavaris states that the gurney can be pushed right up the two inclined channels of his loading track by one man, with no jolts or risk of being dropped. An easily reached lever makes it possible to lock the device against back-sliding at any desired point.

Rights in the patent have been vested in a unique type of assignee: American Legion Amador Post No. 108, of Jackson, Calif.

Science News Letter, September 4, 1943

CHEMISTRY

Better Plastic Layers Designed for Safety Glass

► SAFER safety glass, made so by a better, stronger plastic layer in its sandwich construction, is the promise of the invention protected by patent 2,327,627, issued to G. J. Esselen of Swampscott, Mass., and assigned by him to the Monsanto Chemical Company.

The transparent plastic sheeting used in safety glass is difficult to make. It must be of a uniform thinness, yet free of strains that might impair either its optical qualities or its mechanical strength. It must have a certain stickiness, so that it will adhere to the glass layer on either side, and this makes it very mean stuff to handle in the necessary preliminary heat-processing.

Mr. Esselen overcomes these difficulties by extruding his sheet through a slot with highly polished edges. It is immediately led onto an endless belt of polished metal, where it receives the necessary heat treatment.

Science News Letter, September 4, 1943

ASTRONOMY

Finding a Safe Port

A good watch and a few tables and charts are all that are essential for a survivor of a shipwreck to chart his course to a friendly port.

By MARTHA G. MORROW

► SURVIVORS of a shipwreck, adrift on a lonely sea, need not pin all their hopes on a chance ship or plane spotting them. With a good watch, and a few tables and charts anyone lost at sea can chart his course to a safe port. A sailor who has recently joined the service, a soldier slightly bewildered by the mysteries of the transport, or a pilot flying over the endless waves need not live in constant fear of being utterly and completely lost, should an accident occur.

Science is now providing improved and simplified means of using the heavens as a guide in sailing so that even those who have never tried navigation can understand the directions and bring the craft to a safe harbor.

If all the emergency equipment of the lifeboat is swept away in the storm, one of our fighting men—or you—could help guide the boat to a safe harbor. First of all, you must find out approximately where you are amid the vast expanse of ocean, then determine which way to go to reach the nearest land. Fortunate are the survivors who have a watch still keeping accurate time, for then their approximate latitude and longitude can be found without complicated calculations and the course planned accordingly.

Compass Not Essential

A watch and a few charts are all that are required in a simplified method suggested by Dr. Charles H. Smiley, director of Ladd Observatory, Brown University. Although a compass and sextant would be welcome additions, even they are not essential. The sun is used by day to determine the boat's latitude and longitude with the aid of the watch and no angles need be measured or approximated. At night the stars point out the direction in which the course must be steered.

A person's latitude may be determined by timing the interval between sunrise and sunset. On any particular date, the length of the day varies for

different latitudes, and simple tables give the information necessary to find the latitude of a place when the time between sunrise and sunset is known. In this manner the latitude of the lifeboat can be determined to within 30 miles if the watch does not gain or lose more than a minute each day—and many inexpensive watches are that good!

Local noon can be found by noting when the sun is highest in the sky, at which time shadows cast by the sun are shortest. Comparison of the time of local noon with Greenwich time would give a fairly accurate value for longitude. Nautical timepieces, such as the chronometer of a ship, are always set on Greenwich time. In other cases the difference between the time shown on the watch and Greenwich time is known. For instance, Eastern War Time, used along the Atlantic coast, is exactly four hours behind Greenwich civil time.

Once the person in distress knows

where he is in that wide expanse of water, it is important to determine in which direction he should try to go. Ports in all parts of the world can be shown on a simple water-proof chart, so the lifeboat navigator now has only to select the one which he wishes to reach. His decision is obviously influenced by distance, prevailing winds and weather.

He steers for it by selecting a certain star and observing its direction each night four minutes earlier than on the preceding night. As he travels toward the star, he approaches its substellar point on the earth located close to the port he wishes to find. Again no compass is required for the watch is depended upon for the exact time to observe the star's direction, although a compass would be invaluable in holding the ship's chosen course during the day.

If our shipwrecked friends thought it wise to head for Recife, Brazil, from somewhere in the Atlantic Ocean, they would be fortunate if they knew that a particular star, Rigel (the brightest star in the constellation of Orion) would be directly overhead at Recife at 8:36



ADRIFT—Survivors of a torpedoed ship, set adrift on the broad Atlantic, need to know where they are and which way they are going.

p.m. Eastern War Time, on that particular night. The course to be followed could then be determined by directing the boat toward this star. Exactly 23 hours, 56 minutes later, Rigel would again be over Recife, and the course could be checked and determined for the following day. The path traveled would be a good approximation of a great circle, the shortest possible path to the destination.

All mathematical computations have been done in completing the information which Dr. Smiley includes in his chart of stars to be used in finding ports in the Atlantic and Pacific. Use of these charts is relatively simple for the uninitiated navigator.

Waterproof Leaflet

A leaflet printed on waterproof paper has recently been prepared for use by the Engineer Amphibian Command of the U. S. Army on emergency navigation by Dr. Bart J. Bok of the Harvard Astronomical Laboratory. This brief guide with tables is designed to assist the person whose navigational instruments have been damaged beyond repair and whose charts, almanacs and tables were swept out to sea. It is for use by those with some background in celestial navigation, but would be of great aid to anyone who suddenly finds himself forced to select a course.

An ingenious shadow marker is recommended to determine the sun's altitude. Even a beginner should be able to use this instrument designed by Sanford Cluett of Troy, New York, who incidentally invented the Sanforizing process for pre-shrinking fabrics. A pin is stuck in the center of a nine-inch graduated circle mounted on cardboard or plywood. This is suspended or weighted down so that the 90-degree division on the circle follows a plumb line. The sun's altitude can then be found by noting the position of the shadow of the pin on the graduated scale.

A table of the sun's declination is given in Dr. Bok's pamphlet so that when corrections have been made, the sailor can tell within 10 nautical miles how far he is north or south of the earth's equator.

In northern latitudes, measurement of the altitude of Polaris, the North Star, gives a good approximation for the latitude. For a more accurate value, a slight correction as listed in the pamphlet must be made since Polaris is one degree away from the true north celestial pole.

Apparent local noon may be found

by observing the sun shortly before and after noon. If the survivor notes on his watch the exact instant when the afternoon altitude of the sun equals the forenoon value, the time of local apparent noon will be half-way between the two. In this method the altitude in degrees, minutes and seconds does not have to be calculated. The time when the apparent sun was on the meridian differs from civil time (the time shown by a watch) by a small amount known as the equation of time. This ranges from zero to almost seventeen minutes. When allowances have been made for this variation, the position is determined quite accurately.

Working with a committee of the Coast Guard, Dr. Bok has just completed an enlarged and simplified version of the pamphlet on navigation in emergencies. Here the use of the pesky equation of time has been eliminated.

If the survivors are not fortunate enough to have a watch, longitude cannot be determined by celestial observations and must be guessed at. If a map is available, the position of a friendly island can be found and a rough north-south course steered until the desired parallel of latitude is reached. Then the navigator should turn west or east depending on the approximate direction of the island, and stay as nearly as possible on the parallel of latitude of the island until land is sighted. Dr. Bok warns that sailors should not attempt to steer directly for the island as when there is uncertainty about the longitude, they may miss the island and become hopelessly lost.

Charts for Airplane Pilots

Pilot charts for years have been considered as essential lifeboat equipment, but ones designed by the U. S. Hydrographic Office are just being furnished airplane pilots. If the shipwrecked person has some idea of where he is, these waterproof charts show how to take advantage of wind and current in reaching port.

The four charts, when wrapped in oil cloth, make a package measuring 9 by 4½ inches and 1¼ inches thick, which weighs about 1½ pounds. They show the north and south Atlantic, and north and south Pacific oceans. On one side of these 26 by 34 inch charts is given the region in winter (the January chart is used for this) and on the reverse, in summer (July chart). Arrows show the direction of the current and wind-roses every five degrees give the

relative frequency, force and direction of the wind.

Science News Letter, September 4, 1943

ENGINEERING

Multiple Parachute Launcher For Delivery of Supplies

► QUICKER and more efficient delivery of ammunition and supplies by parachute is provided by an invention of Capt. Harry Wilson, Air Force officer now located at Wright Field. His device is covered by patent No. 2,326,813, rights in which are assigned to the government, without payment of royalties.

Instead of heaving parachute-borne supply packs out one by one, in Capt. Wilson's system they are all shoved out the paratroopers' jumping door together. The parachute on the tail-end pack is jerked out by its static cord. As this parachute opens and the pack's rate of drop is checked, the next pack's static cord, attached to the first pack's lower end, is jerked in turn; and so on for each of the packs in the series. This saves time in launching the collection of all the equipment, and also insures that they will hit the ground closer together.

Science News Letter, September 4, 1943

WANTED! FOR POST-WAR MARKETS

New ideas or patents relating to equipment, apparatus, or instruments applicable to research and control laboratory work, embracing—

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MEDICINE

Gnats Carry Disease

Scientists organize to fight onchocerciasis, a little-known disease found in Guatemala and Mexico. The infected area crosses the Pan American highway.

► THOSE who hope to take post-war vacation jaunts over the Pan American highway to our southern neighboring republics will be passing through the haunts of a little-known disease called onchocerciasis.

Although there is small danger to tourists merely passing through the infected areas in Guatemala and Mexico, scientists are now organizing a fight aimed at control or eradication of the disease for the protection of the natives and travelers who may stop in the vicinity.

The only spots on the American continents known to contain the gnat-borne illness are one small area in the State of Oaxaca, two small areas in the State of Chiapas in Mexico—not far from the Guatemalan boundary—and two small areas in central Guatemala. The largest area is about 75 miles in diameter in the State of Chiapas, Mexico. And the present surveyed route of the Pan American Highway runs right straight through it. The disease is showing a tendency to move slowly northward into other areas.

The buffalo gnat, which carries it, is common in much of the United States as well as in the areas affected and nearby regions. Biting an infected per-

son, the insect sucks in blood and the disease-causing filaria parasites. She then bites a healthy person, depositing the little worms in the skin.

Soon a nodule appears and the microscopic larval worms begin to grow, become adults about an inch long, and breed young. Adults never leave the nodule, but the young get into the blood stream and the cycle is complete, ready to begin again.

After infection of the blood stream rheumatic symptoms appear in the infected person, legs become enlarged, and sometimes epilepsy results.

In some parts of the small area affected, from 40% to 60% of the natives are reported to be infected.

Strangely enough, white men who become infected do not show the same tendency to become blind as do the natives. This may be accounted for by the fact that white men who are better nourished can withstand more, says Dr. Frank Roberts, professor of preventive medicine at the University of Tennessee, who has recently returned from a two-month stay in the onchocerciasis area. No other explanation has been found by prominent Mexican scientists who have been studying the disease.

"It looks to me," Dr. Roberts comments, "as if the route of the new road should be changed or else it will become necessary to make some arrangements for people to close up their cars and hurry through the area to keep from being bitten. To stop for lunch or to fix a flat would be an open invitation to the gnat to come out and eat too."

This phase of the situation was first emphasized in a paper published in the *Boletín de la Oficina Sanitaria Panamericana* in August, 1942. The matter was also fully considered at the Eleventh Pan American Sanitary Conference, held at Rio de Janeiro in September of the same year.

The Pan American Sanitary Bureau, as well as the Mexican and Guatemalan health authorities, have a solution different from Dr. Roberts'. They are planning intensive studies of the disease with a view to conducting an effective

campaign which will serve either to eradicate it or at least control it. For this purpose, the Pan American Sanitary Bureau, which is the international health organization of all the American Republics, is now organizing a group of sanitary engineers, physicians, veterinarians, entomologists and other scientists to go into the area to make a thorough study of the disease. Five or six field parties will be made up, with headquarters in Guatemala.

Studies will include work on how the illness is transmitted and how it may be best combated. It is now thought that no other animal besides man can carry the disease.

An effort will be made to improve methods of treatment. Better laboratory facilities will be established by the disease fighters from the Pan American Sanitary Bureau. At present, treatment consists of cutting off the nodules, which kills the adult and causes eventual disappearance of the young from the blood stream.

An extensive survey will also be made of the geographical extent of the disease, of the factors causing its spread, and of control methods.

A further effort will be made to co-ordinate these investigations with similar work which has been or may be conducted in West Africa, which is the original source of the disease.

The presence of onchocerciasis has long been known, having been identified as far back as 1915 by the famous Guatemalan investigator, Robles, and only a few years afterwards in Mexico. The condition was the subject of wide discussion at the Second Pan American Conference of National Directors of Health in 1931.

Science News Letter, September 4, 1943

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This one's going to hurt!

Invasion comes high—in blood and money.

Part of the cost must be paid with human life. That means deep and lasting hurt for many and many an American family.

Part of the cost must be paid in cash . . . this September. And that's going to hurt, too!

The 3rd War Loan Drive is here!

To pay for invasion—to get the money to keep our fighting machine going—you, and every man or woman in America, are asked to invest in at least one extra \$100 Bond in September.

\$100 EXTRA, mind you—for everybody!

No man or woman can hold back. No man or woman can point to his Payroll buying and say, "They don't mean me!" No man or woman can say, "I'm already lending 10% or 12% or 20%—I'm doing enough!"

Sure—it's going to hurt. It's going to take more than spare cash this time—more than just money that might have gone for fun. It's going to take money you have tucked away. It's going to take part of the money we've been living on—money that might have meant extra shoes or clothes or food! Money that might have gone for anything that we can get along without!

Sure—it'll be tough to dig up that extra money. But we've got to do it—and we will.

We'll do it partly because of the look that would come over the faces of our fighting men if we should fail. We'll do it partly because the cheapest, easiest way out of this whole rotten business is for everybody to chip in all he can and help end it quick. We'll do it partly because there's no finer, safer investment in the world today than a U. S. War Bond.

But mostly, we'll do it because America is right smack in the middle of the biggest, deadliest, dirtiest war in history.

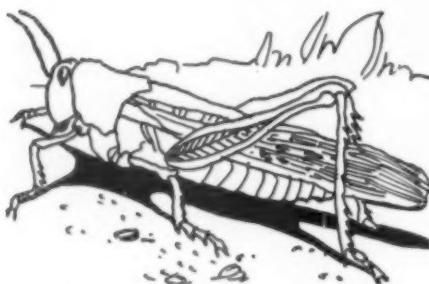
And we're Americans.

Back the attack with War Bonds

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**Wisdom From Grasshoppers**

► GO TO THE grasshopper, thou busybody, consider his ways, and be wise: such might well be the text of *The Grasshopper Book*, by Wilfrid S. Bronson, (Harcourt, Brace, \$1.75).

Mr. Bronson disagrees with Aesop in the latter's judgment of the worthlessness of grasshoppers, and with both Aesop and Solomon in their overweening opinion of the superlative virtues of the ant.

"As a boy I didn't really know just why I felt that Aesop's fable was unfair," he states. "But now I do. Whoever studies insects soon finds out that, though many kinds of ants work hard, other kinds are thieves, slave-makers, murderers, and cannibals, and do no work at all. Then, if he looks up the grasshopper's list of relatives, he discovers that it also has both good and bad, like everybody else."

"Hard work is well worth while, of course. But music is important, too. No ant can fiddle, but a grasshopper can."

The real crux of the matter, the author contends, is not how well any creature shows (or seems to show) qual-

ities which we human beings consider admirable, but how well it meets the problems of getting a living for itself and of propagating its species.

"Men, ants, and grasshoppers," he points out, "preserve their kind, each in its own special way. Since each succeeds age after age, why should one be praised more than the other?"

Mr. Bronson, who is an artist as well as a naturalist, has kept insects of the grasshopper tribe in cages in his house, so that he might study their structure and behavior intimately and exactly. He graphically shows how a grasshopper's long hind leg, for example, is a multi-purpose tool fit to delight the heart of the most ingenious Yankee tinkerer: it

is a combination catapult, landing gear, fiddlestick, pole climber and scratching apparatus.

In the more complex field of insect behavior, Mr. Bronson's observations and drawings are no less exact and entertaining. He tells of a male field cricket that displayed very evident jealousy when another male was introduced into the cage with him and his mate, yet was not above trying what looked a bit like a tentative flirtation with a completely exotic female, a red-legged locust. And the series of little sketches showing how this same insect cleans his legs, antennae and body remind one irresistibly of the grooming antics of a small dog.

Science News Letter, September 4, 1943

VOLCANOLOGY

Allies Gain Volcanoes

The Eolian Islands, recently mopped up by the Allied forces, are the home of two volcanoes which are unique among fire-mountains.

► IN PICKING UP the Eolian islands, that lie in the angle between Sicily and the toe of the Italian boot, United Nations forces have taken into custody two volcanoes with claims of their own to uniqueness among fire-mountains.

Vulcano, on the island of the same name, may be regarded as the "type specimen" of its class, for its particular name obviously is the general name for all volcanoes. Why this particular cone should have come to be par excellence "the" volcano, especially with the much more impressive peaks of Vesuvius and Etna not far away, it is hard to guess. The evolution of geographic names, through the often obscure course of history, is often anything but logical.

Stromboli, which has also given its name to its island, is famed for a different reason. Of all volcanoes, it comes

nearest to being incessantly in action. It booms and rumbles day and night, though seldom blowing off violently enough to cause harm. It used to be claimed that it never stopped, but it is now known that Stromboli has occasional periods of quiescence, sometimes several months in length.

Stromboli, with a height somewhat over 3,000 feet, compares fairly with Vesuvius, which is just under 4,000, but not at all with Etna's towering 10,000. Vulcano, with its highest point only a little more than 1,600 feet above sea level, is relatively a dwarf.

Volcanoes were regarded in ancient mythology as the chimneys of Vulcan's forge. By transfer, they became in medieval and early modern times the chimneys of hell. Something of this notion lingers still in the rather widespread impression that they are direct vents to the molten interior of the earth.

While it is true that the ultimate source of a volcano's heat is the interior heat of the earth, the connection is not so simple as this picture would make it. Modern geological research indicates that volcanoes are more or less localized affairs, and that molten rock that flows from them is produced on the spot by local causes.

The modern picture is something like this: Surface layers of rock are pushed into folds by the mountain-forming shifts and shrinkings of the earth. Deep

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terrestrial heat plays a part in setting these foldings in motion. The harder, firmer rocky strata bend, perhaps break, but do not crumble. The folding and bending cause severe local heating, just as a strip of sheet metal can be heated by rapid bending.

At some point beneath the fold, soft rock crumbles, is melted by the heat, and partly dissolves in the presence of intensely hot steam, sulfurous gases and other vapors. This becomes the magma or lava. It may flow quietly out through cracks in the rock, as at Etna and Kilauea, or the access of more water from the surface may cause the flash generation of more steam and a destructive boiler-like explosion, like the classic one of Vesuvius that destroyed Pompeii or the gigantic one in our own time that blew the top off Mt. Katmai in Alaska.

Science News Letter, September 4, 1943

GENERAL SCIENCE

Research Grants Permit Important Work to Continue

► RESEARCH GRANTS to 11 scientists were announced by the Society of the Sigma Xi, national honorary fraternity for the promotion of research. Totaling \$2,240, the grants will allow the continuation or completion of important researches which otherwise might have to be abandoned; other projects of scientific importance will be reinforced by the grants.

Funds came from small contributions made by thousands of Sigma Xi members throughout the country.

Scientists receiving the grants were Dr. R. H. Alden of the University of Tennessee, Dr. T. T. Chen of the University of California, Dr. E. E. Dale of Union College, Dr. E. S. Deevey, Jr., of Rice Institute, Dr. R. R. Humphrey of the University of Buffalo, Dr. A. T. Miller, Jr., of the University of North Carolina Medical School, Dr. E. H. Myers of Stanford University, Dr. C. A. Neuberg of New York University, Dr. H. H. Nininger of the American Meteorite Laboratory in Denver, and Dr. R. A. Studhalter and Dr. W. S. Glock of Texas Technological College.

The committee making the awards consisted of Dr. Harlow Shapley of Harvard College Observatory, president of the Society of the Sigma Xi; Dr. Hugh S. Taylor of Princeton University; and Dr. L. C. Dunn of Columbia University.

Science News Letter, September 4, 1943

• New Machines and Gadgets •

★ MEDICINE SPOONS with tightly fitting covers may soon be available for the parent who must give medicine to an unwilling youngster. The loaded spoon is inverted, put into the mouth and a discharge valve opened by pulling a slide.

Science News Letter, September 4, 1943

★ AVIATOR PADS, made of animal hair mixed with a small amount of reclaimed rubber, are used for pilot seats, parachute seats, and bombardier pads. Since the product costs only a fourth as much as the spongy rubber formerly used, economies are also expected by its use in post-war civilian products.

Science News Letter, September 4, 1943

★ SAFETY SIPHONS for transferring acids and other dangerous liquids from large to small containers are now available made of flexible thermosetting plastic tubing. Free flow and easy control are claimed. The tubing is acid and corrosion resistant.

Science News Letter, September 4, 1943

★ PLASTIC PELLETS for bullets, and compressed air instead of powder, are used in electric guns which produce all the racket and recoil vibrations of anti-aircraft weapons. These guns are used effectively in training soldiers at considerable saving in cost.

Science News Letter, September 4, 1943

★ ROBOT AIMING devices, known as gyro-stabilizers, increase by several hundred per cent the shooting accuracy of new Army tanks while in motion, even if racing at full speed. The stabilizer keeps the gun barrel at a fixed elevation and the target within focus of the gunner's telescopic sight. The gunner can fire quickly and effectively, making only slight manual adjustments when necessary.

Science News Letter, September 4, 1943

★ SPIN-TEST machines for inspecting shell fuses simulate the action of shells in flight, practically eliminating the possibility of "duds" reaching gunners. The testing machine looks like a table-size radio. It has a high-speed motor. By placing a fuse on an adapter attached to the motor shaft, it is possible to tell at a glance if the mechanism is properly adjusted. Millions of fuses are tested each month.

Science News Letter, September 4, 1943

★ SOUND FREQUENCY analyzers, electrical instruments used to measure current frequencies, are now used experimentally by physicians. Combined with the electric cardiograph it shows what part of the heart cycle is responsible for an abnormal heart action. The device also has many industrial uses.

Science News Letter, September 4, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 172.



First Glances at New Books

► THE GREEN EARTH, by H. W. Rickett, is subtitled "an invitation to botany." It is just that; it makes good again botany's ancient claim as *scientia amabilis*. The book is capable of being used as a text in school classes, but equally (or even more) of being read with delight by anybody who just wants to know about plants and what makes them tick. The illustrations are all line drawings, so briskly done that they are much more "alive" than photographs. (*Jaques Cattell*, \$3.50)

Science News Letter, September 4, 1943

► SEVEN editions of J. F. Williams' TEXTBOOK OF ANATOMY AND PHYSIOLOGY in the course of 20 years argue it a good book. This new edition is streamlined to meet war conditions, but lacks nothing in completeness. (*Saunders*, \$2.75)

Science News Letter, September 4, 1943

► VERTICAL WARFARE, by Francis Vivian Drake, is a vivid description, in layman's language, of air war in all its phases, from precision bombing to leaflet dropping. The author is an advocate of the plan to bomb the Axis into submission, with relatively little aid from ground and sea forces. (*Doubleday Doran*, \$3)

Science News Letter, September 4, 1943

► AUTUMN is the favored time for planting trees and shrubs. Timely, therefore, is the appearance of SHRUBS AND TREES FOR THE SMALL PLACE, by P. J. Van Melle (*Scribners*, \$2.50). The greater part of the book is taken up with compact encyclopedic descriptions of popular species; other sections give suggestions for planting, pruning, etc.

Science News Letter, September 4, 1943

► A TIMELY VOLUME beginning with World War I, the World of Versailles, and Europe after 1919, and extending through four years of the present war is THE WAR IN MAPS, by Francis Brown, Emil Herlin and Vaughn Gray (*Oxford Univ. Press*, \$2). Statistical charts of manpower and production are included. It is an atlas of New York Times maps.

Science News Letter, September 4, 1943

► PHYSIOLOGISTS who find it difficult to keep up with current journal literature, especially since the war has

caused so many dislocations in supply, will find special value in the fifth volume of the ANNUAL REVIEW OF PHYSIOLOGY, edited by James Murray Luck and Victor E. Hall. Subjects have been well chosen and compactly but adequately summarized, by an array of distinguished workers in the field. Bibliographies are full, and should prove useful. (*Am. Physiol. Soc., and Annual Reviews, Inc.*, \$5)

Science News Letter, September 4, 1943

► BERTHA DAMON, who wrote *Grandma Called It Carnal*, has done an equally amusing book about her experiences in getting a successful lawn and garden out of stubborn, rocky New Hampshire soil and an even more stubborn, rocky New Hampshire man-of-all-work (who, however, prefers to chop wood) named Samule. The book is named A SENSE OF HUMUS. (*Simon and Shuster*, \$2.50)

Science News Letter, September 4, 1943

• Just Off the Press •

TREATMENT OF EXPERIMENTAL DATA—Archie G. Worthing and Joseph Geffner, —*John Wiley & Sons*, 342 p., illus., \$4.50. An advanced book of material for the specialist in physics, chemistry and engineering.

CHEMICAL SPECTROSCOPY — Wallace R. Brode—2nd ed., *John Wiley & Sons*, 677 p., illus., college ed. \$6.50, trade ed. \$7.50. A good book for the laboratory man in industry and the advanced undergraduate at college.

WHAT YOU SHOULD KNOW ABOUT SYPHILIS AND GONORRHEA—Max J. Exner—*Amer. Social Hygiene Assn.*, 80 p., illus., (publication No. A186x), 10c.

ALLIED'S RADIO DATA HANDBOOK: A Compilation of Formulas and Data Most Commonly Used in the Field of Radio and Electronics — Nelson M. Cooke, ed.—*Allied Radio Corp.*, 48 p., illus., 25c. The book should serve as a distinct aid to the student learning fundamentals, the service man for technical data; the experimenter for practical information and the engineer seeking a time saving reference.

VITAMINS AND HORMONES: Advances in Research and Applications — Robert S. Harris and Kenneth V. Thimann, ed.—*Academic Press*, Vol. I, 452 p., illus., \$6.50.

ANIMAL TRACKS—George F. Mason—*W. Morrow & Co.*, 95 p., illus., \$1.50.

COPPER CAMP: Stories of the World's Greatest Mining Town, Butte, Montana—Writer's Project of Montana—*Hastings House*, 308 p., illus., \$2.75.

MEETING THE MAMMALS—Victor H. Cahillane—*Macmillan*, 133 p., illus., \$1.75.

PLANTS AND VITAMINS—W. H. Schopfer—*Cronica Botanica*, 300 p., illus., \$4.75.

MANAGEMENT OF CHANCROID: Granuloma Inguinale and Lymphogranuloma Venereum in General Practice—Robert B. Greenblatt—*Govt. Printing Office*, 43 p., illus., 15c., Supplement No. 19 to venereal disease information.

MARKET DISEASES OF FRUITS AND VEGETABLES: Citrus and other Subtropical Fruits—Dean H. Rose, Charles Brooks, C. O. Bratley, and J. R. Winston—*Govt.*

Printing Office, 57 p., illus., 70c. (Miscellaneous publication No. 498)

ICELAND AND GREENLAND — Austin H. Clark—*Smithsonian Institution*, 103 p., illus., free upon direct request to Smithsonian Institution, Smithsonian Institution War Background Studies: Number 15.

FUNGI REPORTED ON SPECIES OF MEDICAGO, MELILOTUS AND TRIFOLIUM — S. J. P. Chilton, L. Henson, and H. W. Johnson—*Govt. Printing Office*, 152 p., 20c. (Miscellaneous publication No. 499)

FUNDAMENTAL PHYSICS — Lloyd William Taylor—*Houghton Mifflin*, 662 p., plus XI p., illus., \$4. Correction: This book does not replace the earlier work, Physics: The Pioneer Science. Both are being kept in print.

GEORGIA FOREST RESOURCES AND INDUSTRIES—A. R. Spillers and I. F. Eldredge—*U. S. Government Printing Office*, 70 p., illus., 25c. (U. S. Department of Agriculture miscellaneous publication, No. 501)

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